App No.: Not Yet Assigned Docket No.: R2180 Inventor: Takaaki Negoro et al. Title: METAL OXIDE SILICON TRANSISTOR AND Docket No.: R2180.0190/P190

SEMICONDUCTOR APPARATUS HAVING HIGH A AND B

FIG. 1A

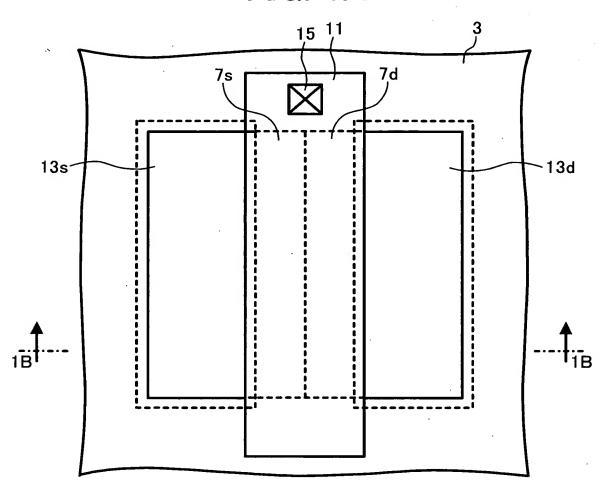


FIG. 1B 13s Р P Р / 7d 7s Nwell Psub

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FIG. 2

1.00X10⁻⁰⁶
1.00X10⁻⁰⁷
1.00X10⁻⁰⁸
1.00X10⁻⁰⁹
2 4 6 8 10 12

CHANNEL LENGTH OF DRAIN SIDE MOS TRANSISTOR (μ m)

FIG. 3 $1.00X10^{-06}$ λ PERFORMANCE (A/V) 1.00X10⁻⁰⁷ 1.00X10⁻⁰⁸ 1.00X10⁻⁰⁹ 1.00X10⁻¹⁰ 1.00×10^{-11} $1.00X10^{-12}$ 0.2 0.4 0.6 8.0 0 **DIFFERENCE IN THRESHOLD VOLTAGE (V)**

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FIG. 4A

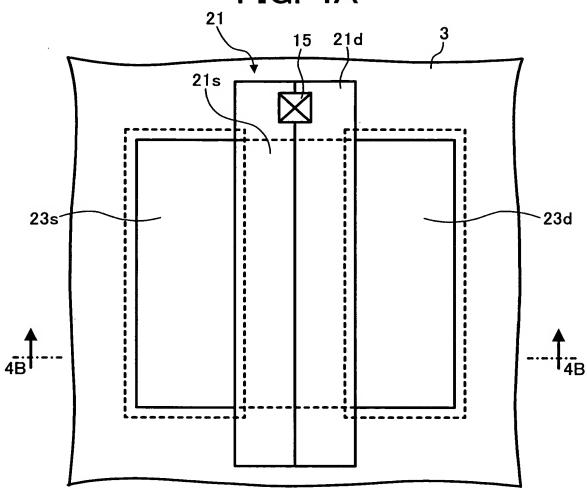
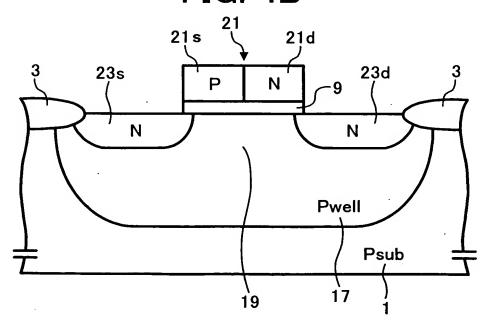


FIG. 4B



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FIG. 5A

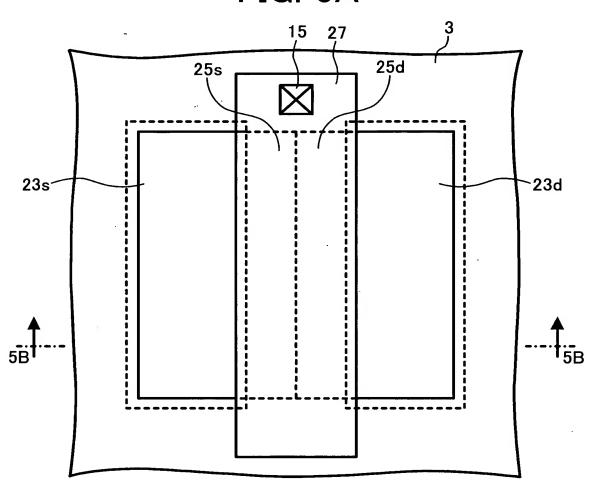


FIG. 5B 2,5 23s 25s 23d Ν ·25d Ν Ν Pwell Psub 19 17

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FIG. 6A

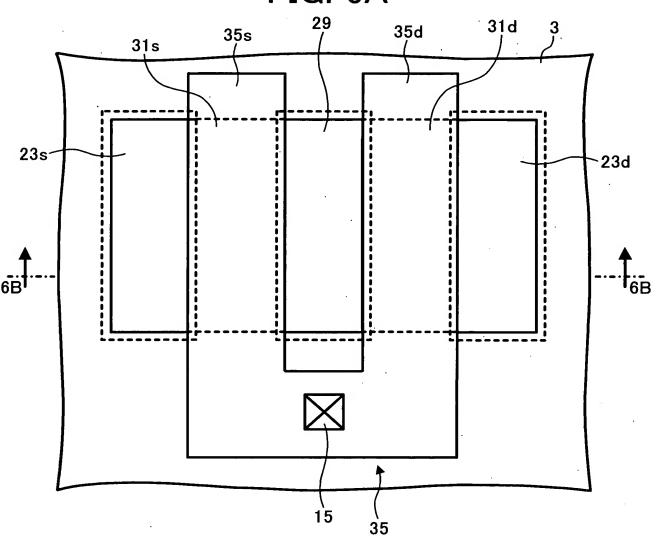
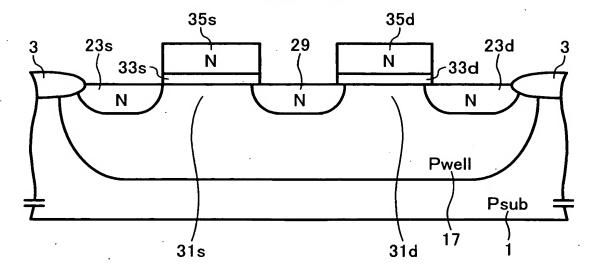


FIG. 6B



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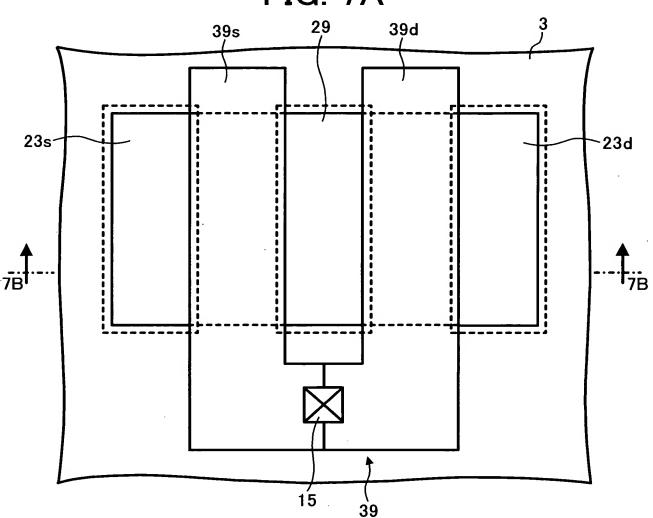
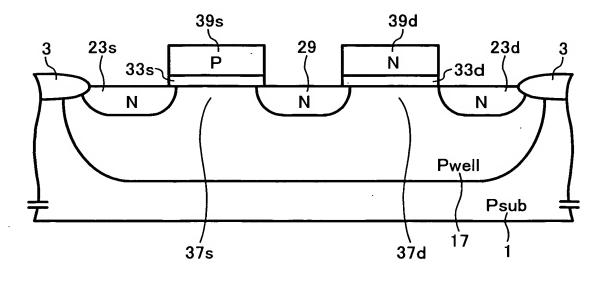
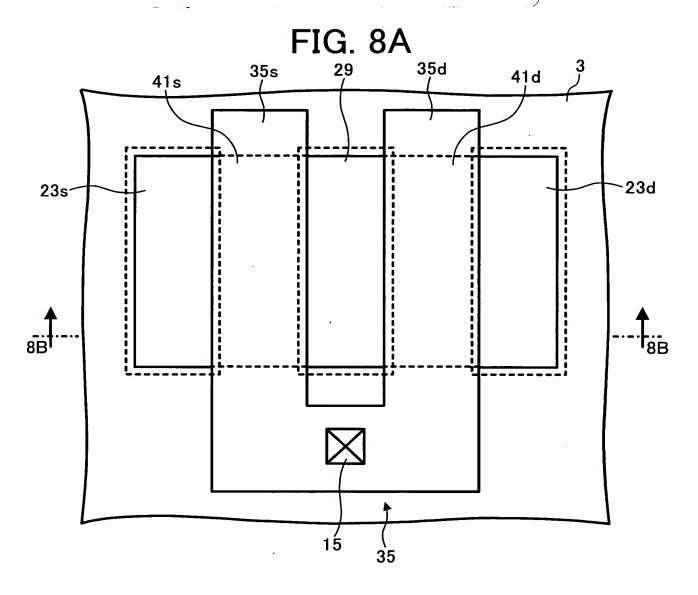


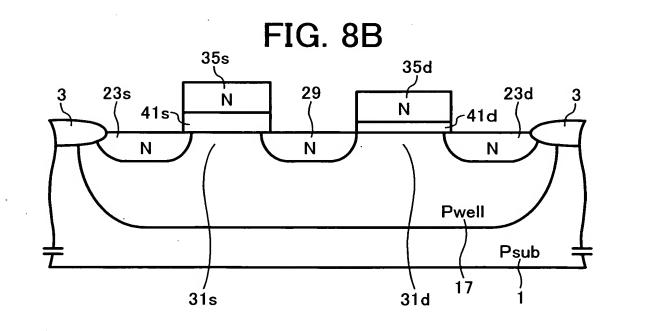
FIG. 7B



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FIG. 9

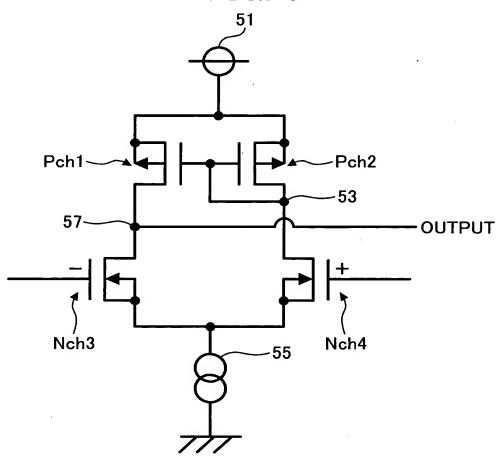
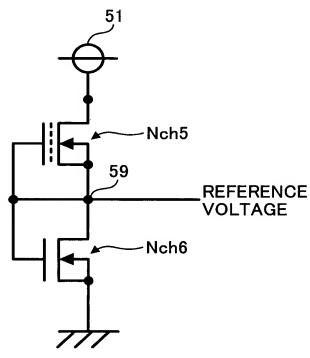


FIG. 10



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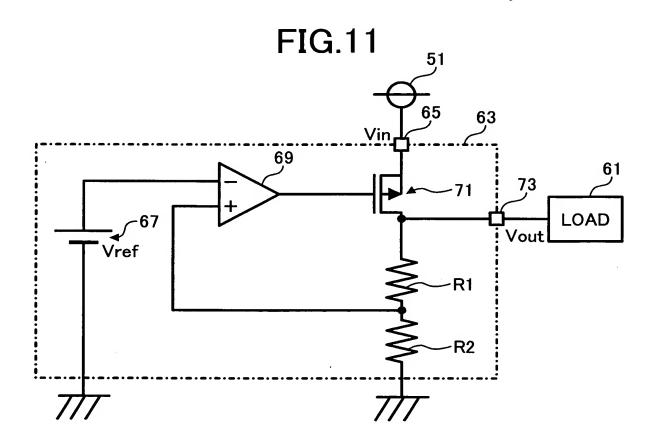
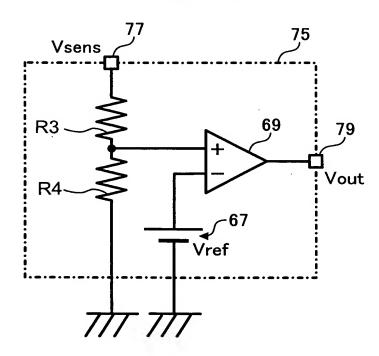


FIG. 12



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SEMICONDUCTOR APPARATUS HAVING HIGH A AND B

FIG.13A

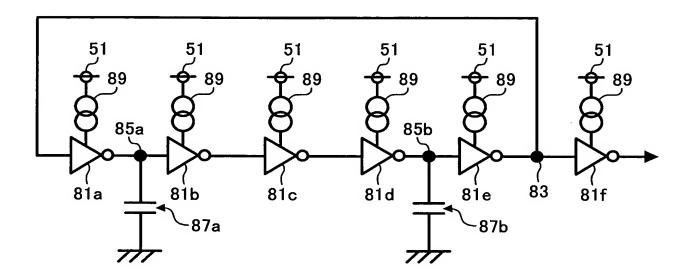
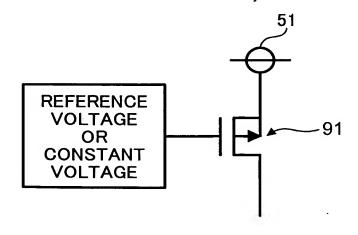


FIG. 13B



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Title: METAL OXIDE SILICON TRANSISTOR AND SEMICONDUCTOR APPARATUS HAVING HIGH A AND B PERFORMANCES

	SOURCE SIDE Vth -0.65V	DRAIN SIDE Vth -0.35V	DRAIN SIDE Vth +0.20V	λ PERFORMANCE (A/V)
COMPARATIVE EXAMPLE 1	2.0 μ m	NOTHING	NOTHING	157 × 10 ⁻⁹
COMPARATIVE EXAMPLE 2	10.0 μ m	NOTHING	NOTHING	35.4 x 10 ⁻⁹
PRACTICAL EXAMPLE 1	2.0 μ m	2.0 μ m	NOTHING	9.93 x 10 ⁻⁹
PRACTICAL EXAMPLE 2	2.0 μ m	10.0 μ m	NOTHING	33.2 x 10 ⁻⁹
PRACTICAL EXAMPLE 3	2.0 μ m	NOTHING	10.0 μ m	0 (NO CHANGE)

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PERFORMANCES

	GATE ELE	GATE ELECTRODE	יסואאאמטרטים ו	
	SOURCE SIDE (P TYPE)	DRAIN SIDE (N TYPE)	A PERFURIMANCE (A/V)	β PERFURMANCE $(\mu A/V^2)$
COMPARATIVE EXAMPLE	ш <i>т</i> 05	DNIHLON	3.80 × 10 ⁻⁹	27.6
PRACTICAL EXAMPLE 1	10 µ m	40 µ m	3.03 × 10 ⁻¹⁰	145.0
PRACTICAL EXAMPLE 2	20 µ m	30 m	9.61 x 10 ⁻¹¹	69.2
PRACTICAL EXAMPLE 3	30 µ m	20 µ m	0 (NO CHANGE)	44.9
PRACTICAL EXAMPLE 4	40 µ m	10 µ m	0 (NO CHANGE)	33.1